NASA-CR-194649

"FROM THE MOONS OF JUPITER TO THE MILKY WAY"

NAGW-3154

A FINAL REPORT

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1. INTRODUCTION

In this report we will describe the successes and problems encountered in carrying out the above project.

Due to funding delays, we were unable to begin the project until February, 1993. The telescopes were ordered in September, 1992. We arranged with the principals of the participating schools, Fruitvale Elementary and Allendale Year-Round to conduct the building and lecture phases of the project during the second and third weeks of February. The principals chose to employ totally different methods of selecting children to participate.

2. FRUITVALE ELEMENTARY

At Fruitvale Elementary, the principal decided to assign to our project the entire class of one 6th grade teacher and a few children from the fifth grade classes. Upon our arrival, we were told we would have to go through the entire program (building and lecturing) twice due to space considerations.

We brought all the materials excepting glue to the school site and worked on building the telescopes in the sixth grade classroom for the first group and in the auditorium (sharing it with the music teacher's classes) for the second. The children were anxious to do the assembly themselves but due to the size of the group and lay-out of the room, the three adults present needed to lend considerable help. The telescope kits (purchased from Edmund Scientific) were fairly easy to use but demanded some precision fitting of the lenses, etc. Because these children had not had much in the way of preparation, some of them were reluctant to participate. In particular, the fifth grade students did not know why they were told to report to the auditorium and although were polite and worked hard, clearly did not have any idea what was expected of them.

Unfortunately, only the sixth grade teacher whose classroom was commandeered participated in building the telescopes or in the lectures that followed. Other teachers had expressed interest but were not assigned to come.

The lecture phase of the project consisted of Dr. Cohen describing (in a highly appreciated, animated way) different telescopes around the world as well as those objects the students might have been able to see. He brought along a great many slides of both professional and amateur quality to illustrate his talk and the students were especially excited to see the slides of the planets and of comets. They were amazed by the size of some of the telescopes they were shown, but asked few questions.

As far as we have been able to determine, most students did not use the telescopes very much and few utilized the journals we left with them. Although we stressed parental involvement, to our knowledge, parents were not informed of the need for their approval and assistance. Things improved at Allendale Year-round.

3. ALLENDALE YEAR-ROUND SCHOOL

The principal of this school chose to invite those fifth and sixth grade students who expressed interest to participate in this program. Parent permission slips were a condition of the students' participation. Unfortunately, the dates chosen and announced were suddenly changed to "student release days" which meant that the students had the day off from school and had to remember to come to school at the scheduled time in the afternoon. Those adults involved were gratified to see that of the forty students who returned their permission slips, 38 students remembered to come. Some came with their

parents, but most arrived on their own, and on time.

The building phase was conducted by three adults with occasional assistance from the principal and other interested teachers who wandered in and out. The building site was the auditorium (reserved solely for our use this time). The students were interested and very excited about what they would see. The enclosed photograph shows their proud faces when they finished building their instruments. They were not shy about asking questions or about asking for assistance. One alumna from the school came by to help and was very useful - she was delighted when we said she could use the demonstration instrument.

The lecture phase was held the next day as it had been at Fruitvale Elementary and elicited the same amazement but far more questions. At both schools, the students were shown how to keep an astronomical journal (dates, drawings, appropriate vocabulary, etc.) and were told to write any questions they had in the journals. It was explained that Dr. Cohen would answer the questions on the same page once a week if possible.

Because the school science teacher had been asked to house the telescopes and journals in her classroom, she was able to monitor the actual usage. The other science teacher collected those journals turned in, and carried them to Dr. Cohen for his written comments and answers to the students' questions. Several representative pages from these journals are included in this report as enclosures. A poster-sized comment is also included.

Unfortunately, although there was high initial interest among the students, this was not sustained. Eventually, only about one-fifth of the 40 students participating turned in their journals more than one time. One or two students, however, did extensive observations and did not hesitate to comment on the state of the sky. They asked good questions and drew some very interesting diagrams of what they saw. Those still at the school occasionally address one of the science teachers as "hey, astronomy lady".

4. GENERAL CONCLUSIONS

1) As has been documented in many studies and programs, elementary students are best engaged in science through hands-on practice. This project also bears this out. All of the students were at peak interest level during the instrument building phase of the program. Questions bubbled up and theories abounded. Furthermore, their self-esteem went up appreciably when they completed building their instruments. Their pleasure in using them even indoors is apparent in the enclosed photograph. They were very proud to be included and to have done the work themselves.

2) In many ways the questions asked during the lecture phase of the project showed the dearth of information about issues in astronomy that the children in these schools experience. Very few of them were able to name the planets or to hazard a guess about which ones they were seeing on the screen. Along with all other aspects of science, astronomy is given short shrift - especially the how-to aspects of it.

3) Again, as has been demonstrated over and over again, parental involvement in student education is crucial if the students are to maintain an interest in any project. This program one required the student either to go outside at night, or at least to identify an appropriate window out of which to point the instrument. It also required some sort of immediate adult intervention with the instrument when it seemed not to be operating correctly, or required practice to operate. Our students' parents were asked to commit to monitoring their childrens' use of the instruments but it is felt that very

little parental input was sought or offered. Judging from the small percentage of journals utilized and the many times that 2/3 of the telescopes remained unchecked-out, it would seem that parents were not questioning their children on their progress in the program.

4) Because of the lack of parental involvement, were this project or one like it to be repeated, it would be necessary to build in some small amount of salary for on-site teachers who would be responsible for checking up on the students and their use of the instruments. We were disappointed in the lack of teacher-support for this project. They supported it in theory but, because of the many demands on their time, were unable to follow through with any assistance. At Allendale Year-round, the full-time science teacher did her best, but time is at a premium and her job requirements are more than full time. She currently runs the science club on a volunteer basis. It is unrealistic to ask her or some one like her continually to seek out those students involved in the program and to remind them to use the instruments, write in journals, formulate questions, etc.

5) Any effort made to involve the disadvantaged students in science is laudable. The childrens' rise in self-esteem, as well as their increased awareness of the possibilities for involvement in the scientific world, were very evident to those of us who participated in this program. NASA is to be commended for trying - a concerted effort with other agencies with scientific mandates might have a real impact on many young lives.

5. SUGGESTIONS

1) The disadvantaged students identified by NASA as desirable target groups are certainly in need of as much hands-on science contact as possible. However, in areas where these groups include significant proportions of children for whom English is not the first language, future projects should include resources for translating information sheets, parent permission slips, etc. The children will probably not need help during the hands-on sessions but, if parental involvement is needed, adequate efforts to explain their responsibilities must be made.

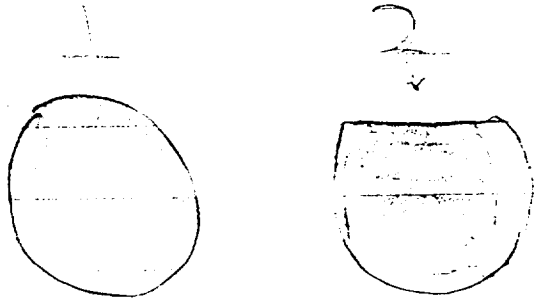
2) Any project requiring the students to observe the night sky really should include the resources to allow the scientists and students to do so adequately. The schools at which we conducted the projects are in very dangerous neighborhoods and it was not financially possible to utilize the schoolyards' open space as a star-gazing site, because the costs of obtaining security for the site were prohibitive. Obvious alternative sites such as the forecourts of the local observatory or science museum were out of reach because of the prohibitive costs of renting the necessary transportation. Parent drivers are difficult to secure during day-time field trips. Night trips would be very difficult to handle if only families were relied on. In addition, some funding for chaperones might be necessary.

3) The local science museum offers an astronomy night each month. During these evenings, amateurs bring their instruments to the museum's forecourt and share them with whomever arrives to enjoy observing the night sky. The museum, too, brings out some of its instruments for sharing. It is not necessary to bring an instrument to participate and there is no cost. It is likely that this type of program is being replicated at many facilities or could easily be started. Perhaps a program to put astronomers in the classrooms

should put its resources into sending the scientists to identified schools to discuss what telescopes do, etc., and then sending him/her out with the students to the local observatory or science museum to really appreciate the sky and to consolidate NASA's message.

ALWAYS PUT THE DATE AT THE TOP IN CASE YOU DISCOVER SOMETHING!

I Seen a Star with my telescope and the Star was red when I looked in my telescope and it was round then I looked again half was cf. The cruve part was sharp.



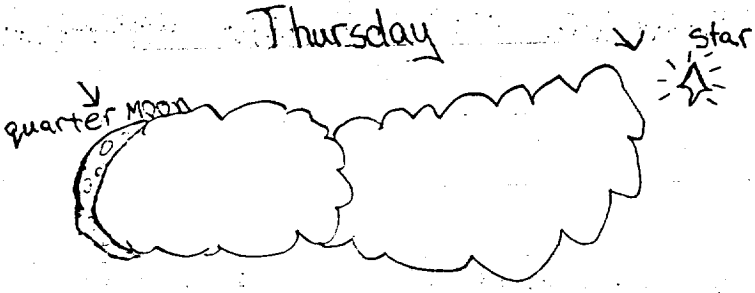
By Leticia Mora.

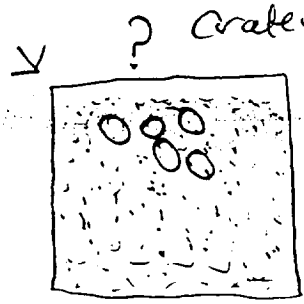
STARS REALLY ARE JUST POINTS - YOU WON'T SEE THEM AS CIRCLES - MORE AS SMALL TWINKLING MESSES! YOU COULD LOOK FOR MARS - THAT'S QUITE BRIGHT AND ORANGE.

[always valuable to put the date on each page]

DATE!? MARCH 18? APRIL 25?

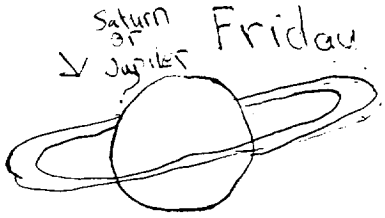
Thursday



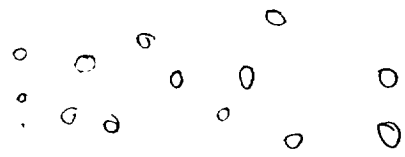


I saw quarter of the moon very close. It had holes in it. And I saw a very bright star. When I stop looking at it, I was seeing red spots. I saw something really bright, but I couldn't tell what it was. It was close. [It could have been Venus, if this was March]

Friday



Stars



(THIS COULD HAVE BEEN JUPITER WITH ITS NEARBY MOONS)
– NEED DATE & TIME TO BE SURE!

I saw a planet with a ring around it. I wasn't sure if it was Saturn or Jupiter? And I saw stars. There were alot.

I DON'T THINK YOUR TELESCOPE COULD SEE SATURN'S RINGS! ONLY A SPACECRAFT COULD SEE JUPITER'S RING.

6-18-1993

Tonight I saw four different stars from brightest to faintest. First I saw one bright star. Then I saw another a bit fainter. I looked for a constellation and found myself looking at another star a bit fainter again. I was about to go in when I took one last look and saw three faint star. The trouble is, once I spot a neat looking group of stars I can't see anything through my telescope I can't get the right angle.

6-25-1993

It was pretty nice and fun watching a plane pass by. You must be right about my lenses in my telescope because I can't see the moon right.

I took a few stars with faint ones around them, and of-course all I saw was one star.

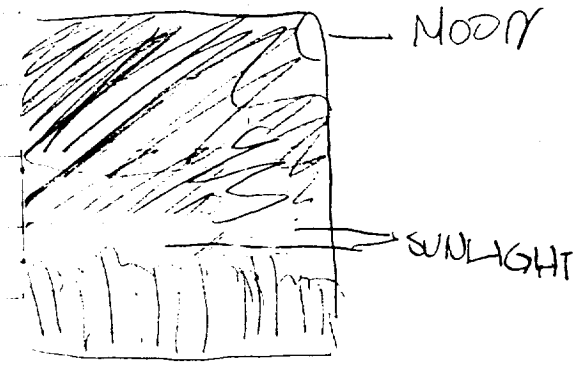
Not through telescope

NOTE:

Astronomy — Saturday — 6-19-1993

TONIGHT I HARDLY SAW ANY STARS. THEY WERE TOO FAINT TO SEE. The stars must be really far away. I THINK IT WAS TOO BRIGHT TO SEE. MAYBE IF I WAS ON THE ROOF WOULD IT BE EASIER TO SEE? IF IT'S TOO BRIGHT WOULD I SEE SOME STARS?

ANSWER TO MY QUESTIONS



ORIGINAL PAGE IS
OF POOR QUALITY

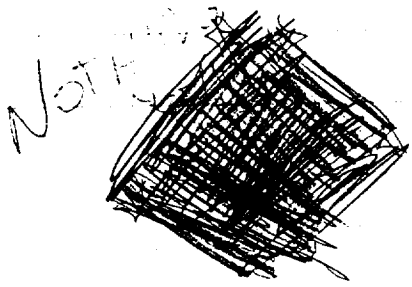
Answers to my Questions

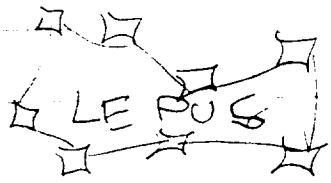
1.

2.

3.

I SAW A GROUP OF STARS IN A FUNNY ~~PATTERN~~ or order KIND OF LIKE THIS:





IF I CONNECT IT, IT'LL LOOK LIKE "LEPUS"

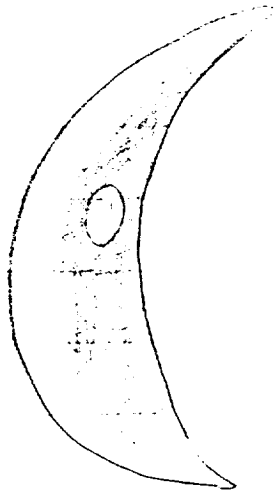
It looked like the "LEPUS"
1. WAS IT?

2. How could I make a stand without it toppling?

Friday

TONIGHT I SAW
the MOON. I SAW
THE CRATERS ON THE
MOON. IT LOOK LIKE
THIS:

GOOD!
WELL DONE!



This big crater is called COPERNICUS (after the famous astronomer who decided the Earth goes around the Sun, & not the Sun around the Earth).